

AMENDMENTS TO THE CLAIMS

Please amend Claims 17, 27, 28, and 30 as indicated below. Also, please cancel Claims 1-8 and 10-15.

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)
10. (Canceled)
11. (Canceled)
12. (Canceled)
13. (Canceled)
14. (Canceled)
15. (Canceled)
16. (Canceled)
17. (Currently Amended) An apparatus for enhancing sound, the apparatus comprising:

a first input and a second input or original audio data, wherein the audio data comprises a full range of frequencies within an original audio band without

~~passing through a subsonic filter~~~~first and second inputs comprise first and second audio information with bass components and other frequencies;~~

~~at least one filter that filters a first set of bass components from the first input and a second set of bass components from the second input;~~

~~a difference circuit configured to identify difference information in the first and second inputs, wherein the difference information has ~~wherein at least a portion of the bass components~~ filtered therefrom ~~in the first and second inputs are removed from the difference information;~~~~

~~an equalizer configured to spectrally shape the difference information in the first and second inputs, wherein the difference information is spectrally shaped by the equalizer by applying a perspective curve characterized by a maximum gain within a first frequency range of 100 to 150 Hz and the curve characterized by a minimum gain within a second frequency range of 1680 to 2520 Hz, wherein the curve decreases at a rate of approximately 6 decibels per octave below the first frequency range and above the first frequency range towards the second frequency range, the curve further increasing at a rate of approximately 6 decibels per octave above the second frequency range, and wherein the equalizer does not spectrally shape the first and second sets of bass components filtered by the filter;~~

~~a summing circuit configured to combine the spectrally shaped difference information with at least a portion of the original audio data in the first input~~first set of bass components that were filtered by the filter~~ to generate a first output comprising the spectrally shaped difference information and the original audio data in the first input including ~~at least a portion of the first set of bass components that were filtered~~ from ~~by the filter and the spectrally shaped difference information, and~~~~

~~the summing circuit further configured to combine the spectrally shaped difference information with at least a portion of the original audio data in the second input ~~second set of bass components that were filtered by the filter to~~~~

generate a second output comprising the spectrally shaped difference information and the original data in the second input including at least a portion of the ~~second set of bass components filtered from by the filter and the spectrally shaped difference information.~~

18. (Original) The apparatus of Claim 17 wherein the maximum gain and the minimum gain are separated by approximately 12 decibels.

19. (Previously Presented) The apparatus of Claim 17 wherein the perspective curve is adjustable to raise or lower the maximum and minimum-gain frequencies with the maximum-gain range and the minimum-gain range.

20. (Previously Presented) The apparatus of Claim 17 further comprising a level adjust circuit in communication with the difference circuit, the level adjust circuit configured to adjust the level of the difference information.

21. (Previously Presented) The apparatus of Claim 17 wherein the difference circuit, the equalizer, and the summing circuit are implemented in a digital signal processor.

22. (Previously Presented) The apparatus of Claim 17 further comprising an attenuator that attenuates the difference information by a fixed amount substantially across an audible frequency spectrum.

23. (Canceled)

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Currently Amended) A method for enhancing sound, the method comprising:

receiving at least a first input and a second input of original audio data, wherein the original audio data comprises a range of frequencies within an original audio band without passing through a subsonic filter ~~first input comprises~~

~~at least a first set of bass components and a first set of other frequencies and wherein the second input comprises at least a second set of bass components and a second set of other frequencies;~~

~~filtering the first and second bass components in the first and second inputs;~~

~~spectrally shaping difference information in the first and second inputs, wherein the spectrally shaped difference information has at least a portion of a the first set of and second bass components have been filtered therefrom, wherein spectrally shaping the difference information boosts the amplitudes of the a second set of frequencies ;~~

~~combining the spectrally shaped difference information with at least a portion of the original audio data ~~first set of bass components~~ in the first input to generate a first output that comprises the spectrally shaped difference information and the original audio data including at least a portion of the first set of bass components that were filtered from by the filter and the spectrally shaped difference information;~~

~~combining the spectrally shaped difference information with at least a portion of the original audio data ~~second set of bass components~~ in the second input to generate a second output that comprises the spectrally shaped difference information and the original audio data including at least a portion of the first ~~second set of bass components~~ that were filtered by the filter and from the spectrally shaped difference information;~~

~~wherein spectrally shaping the difference information further reduces the amplitudes of a third set of frequencies relative to the amplitudes of the second set of frequencies, the third set of frequencies occurring at higher frequencies than the second set of frequencies; and~~

~~wherein a maximum reduction of the amplitudes of the third set of frequencies occurs at approximately 2.1 kilohertz.~~

28. (Currently Amended) A method for enhancing sound, the method comprising:

receiving at least a first input and a second input of original audio data, wherein the original audio data comprises a range of frequencies within an original audio band without passing through a subsonic filter~~first and second inputs comprise at least a first set of bass components and a second set of other frequencies;~~

~~filtering the first set of bass components in the first input;~~

spectrally shaping difference information in the first and second inputs, wherein the difference information has a portion of a first set of bass components filtered therefrom, and wherein spectrally shaping the difference information boosts the amplitudes of a ~~the~~ second set of frequencies;

combining the spectrally shaped difference information with at least a portion of the original audio data ~~first set of bass components filtered in the first input to generate an output that contains~~ at least a portion of the spectrally shaped difference information and the original audio data including a the portion of the first set of bass components that were filtered from the spectrally shaped difference information~~in the first input;~~

wherein spectrally shaping the difference information further reduces the amplitudes of a third set of frequencies relative to the amplitudes of the second set of frequencies, the third set of frequencies occurring at higher frequencies than the second set of frequencies; and wherein spectrally shaping the difference information further boosts the amplitudes of a fourth set of frequencies relative to the amplitudes of the third set of frequencies, the fourth set of frequencies occurring at higher frequencies than the third set of frequencies.

29. (Previously Presented) The method of Claim 28 wherein a maximum boost of the amplitudes of the fourth set of frequencies occurs above approximately 2.1 kilohertz.

30. (Currently Amended) A method for enhancing sound, the method comprising:

receiving at least a first input and a second input of original audio data, wherein the original audio data comprises a range of frequencies within an original band without passing through a subsonic filter~~first and second inputs comprise a first set of bass components and a second set of frequencies that occur at other frequencies;~~

~~filtering the first set of bass components in the first and second inputs;~~

spectrally shaping difference information in the first and second inputs, wherein the difference information has a portion of a first set of bass components filtered therefrom, and wherein spectrally shaping the difference information modifies the amplitudes of a ~~the~~ second set of frequencies; and

combining the spectrally shaped difference information with at least a portion of the original audio data ~~first set of bass components filtered in the first input to generate an output that comprises the~~ spectrally shaped difference information and the original audio data including a portion of the first set of bass components that were filtered from in the first input and the spectrally shaped difference information;

wherein spectrally shaping the difference information further modifies the amplitudes of a third set of frequencies such that the amplitudes of the third set of frequencies are less than the amplitudes of the second set of frequencies, the third set of frequencies occurring at higher frequencies than the second set of frequencies; and

wherein spectrally shaping the difference information further modifies the amplitudes of a fourth set of frequencies such that the amplitudes of the third set of frequencies are greater than the amplitudes of the third set of frequencies, the fourth set of frequencies occurring at higher frequencies than the third set of frequencies.

Application No.: 10/614,623
Filing Date: July 7, 2003

31. (Previously Presented) The audio enhancement system of Claim 30 wherein spectrally shaping the difference information is performed by a digital signal processor.